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⑤4発明の名称　温熱治療用プローブ

⑳特　願　昭63-275632
㉒出　願　昭63(1988)10月31日

㉗発明者　福　家　　敏　東京都渋谷区幡ケ谷2丁目43番2号　オリンパス光学工業株式会社内
㉗発明者　石　原　安一郎　東京都渋谷区幡ケ谷2丁目43番2号　オリンパス光学工業株式会社内
㉗発明者　塚　谷　　隆志　東京都渋谷区幡ケ谷2丁目43番2号　オリンパス光学工業株式会社内
㉑出願人　オリンパス光学工業株式会社　東京都渋谷区幡ケ谷2丁目43番2号
㉔代理人　弁理士　坪井　　淳　外2名
最終頁に続く

明　細　書

1．発明の名称

温熱治療用プローブ

2．特許請求の範囲

体腔内の患部を温熱治療する温熱治療用プローブにおいて、体腔内に挿入するプローブ本体と、このプローブ本体内にその先端から突没自在に設けられ突出して該患部に対応する位置に到達する複数の超音波振動子と、この振動子を駆動する駆動手段とからなり、プローブ本体を体腔内に挿入し、その振動子を突出し該患部に到達して加温するようにしたことを特徴とする温熱治療用プローブ。

3．発明の詳細な説明

〔産業上の利用分野〕

本発明は例えば前立腺肥大症等を温熱治療する温熱治療用プローブに関する。

〔従来の技術〕

近年、前立腺肥大症の治療を温熱で行なう方法が考えられている。これは前立腺を約3°C程度加温すると、その前立腺肥大症が治癒することを利用するものである。

そして、従来は例えばマイクロ波用アンテナを設けたカテーテルを尿道に挿入してそのアンテナからマイクロ波を照射し、加温治療していた。

また、例えば実開昭62-29217号公報で知れるようにチューブ体の中間一部の外周に金属パイプなどの導電体を設け、これにより加温用電界を集中させるようにしたものが提案されている。

〔発明が解決しようとする課題〕

しかしながら、上記各方式にいずれも該加温対象の患部、たとえば前立腺の後面にまたはその近傍に、マイクロ波用アンテナまたは加温用電極を設置するのであるから、その前立腺全体の温度を全体的に均一に加温することはできない。また、全体的に良好かつ効率よく加温することができなかった。

本発明は上記事情に着目してなされたもので、その目的とするところは該加温対象部を全体的に均一で効率よく良好に加温することができる温熱

なお、本発明は記述した実施例のものに限定されるものでない。その要旨を逸脱しない範囲で種々の変形が可能である。また、使用する治具材料は同立体に限らない。また、上記針状電極を2本で一対とする場合は双極電極としては並し、その電極間に高周波エネルギを印加して通電加熱する方式としたものでもよい。

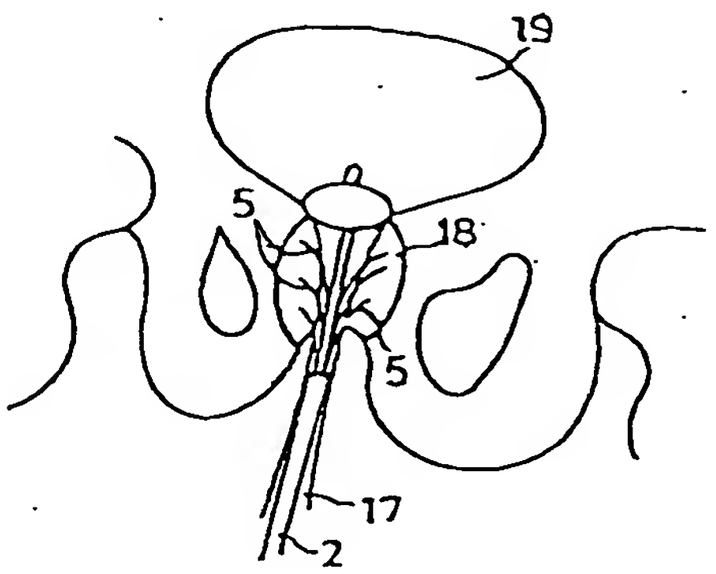
〔発明の効果〕

以上説明したように本発明の体腔内生体の経皮的超音波プローブは複数の針状電極を放射状位置に移動して出没するようにしたから、被治療対象部位を全体的に均一で効率よく短時間に加熱することができる。

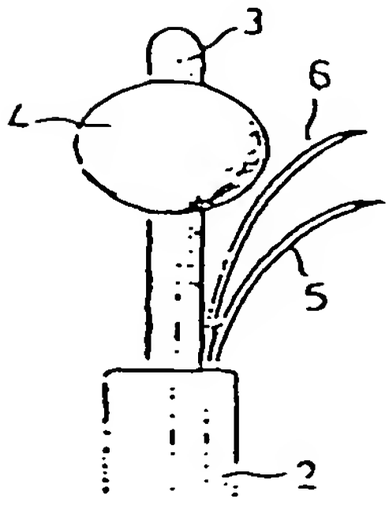
4．図面の簡単な説明

第1図に本発明の第1の実施例を示す経皮的超音波プローブの断面図、第2図に同じくその第1の実施例の経皮的治療システムを含めた概略説明図、第3図に同じくその第1の実施例の経皮的治療システムの使用状態図、第4図は本発明の第2の実施例を示す経皮的超音波プローブの先端付近の断面図、第5図に同じくその第2の実施例における針状電極の先端部の断面図である。

1…経皮的超音波プローブ、2…シース、5…針状電極、6…操作ハンドル、7…シース保持材、18…固定具。



第3図



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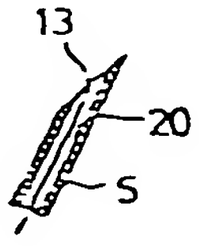
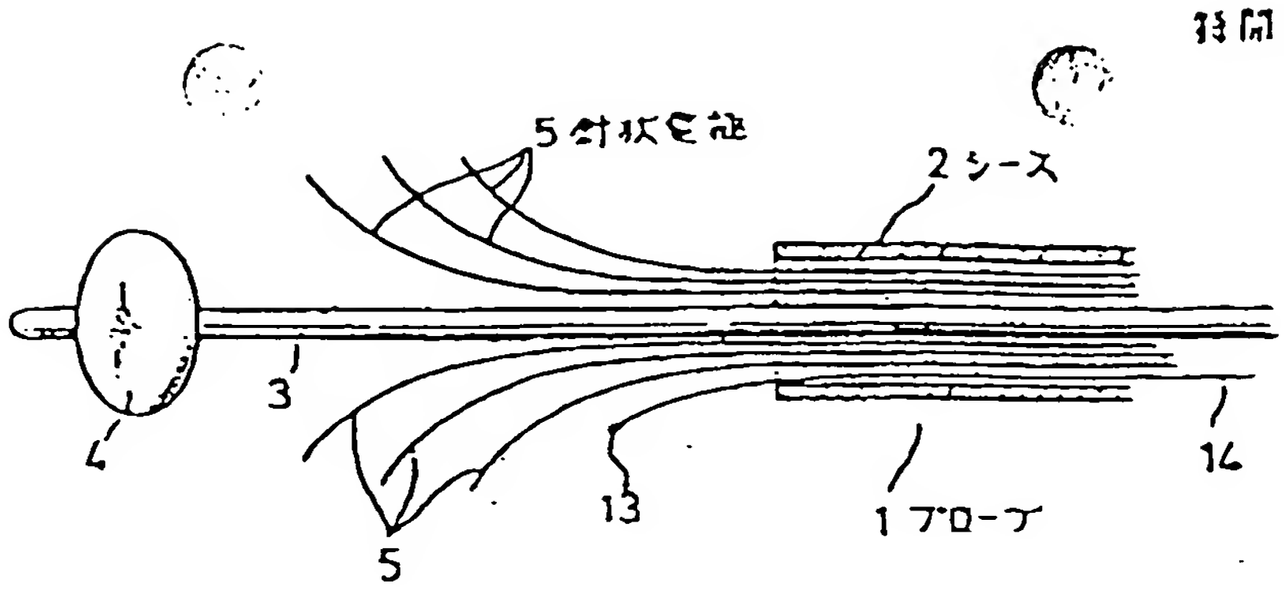
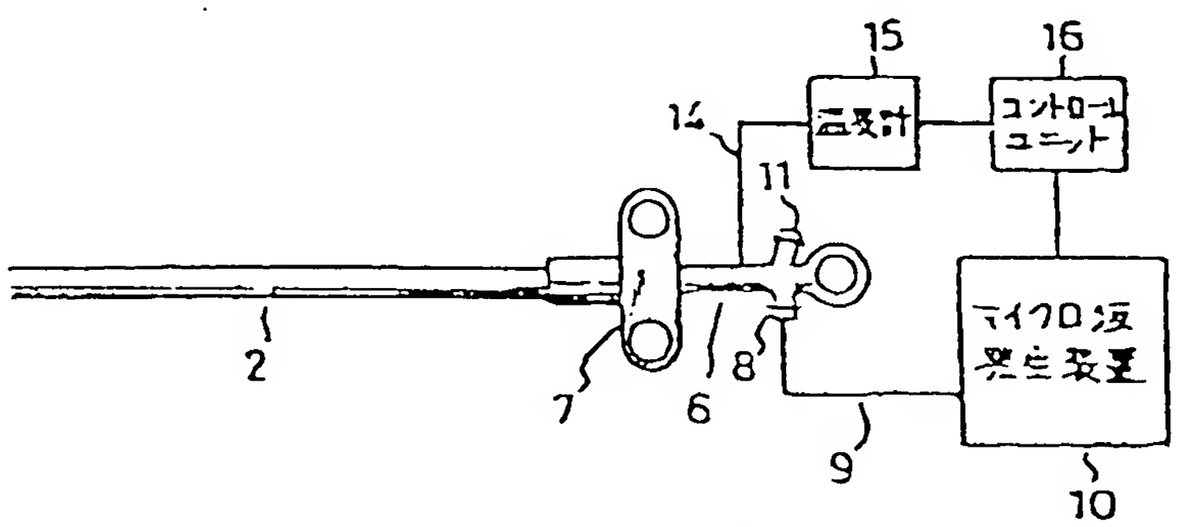


第5図



第 1 図



第 2 図

第1頁の続き
⑦発 明 者 八 日 信 二 東京都渋谷区幡ケ谷2丁目43番2号 オリンパス光学工業株式会社内
⑦発 明 者 布 志 栄 一 東京都渋谷区幡ケ谷2丁目43番2号 オリンパス光学工業株式会社内
⑦発 明 者 林 正 明 東京都渋谷区幡ケ谷2丁目43番2号 オリンパス光学工業株式会社内
⑦発 明 者 西 垣 晋 一 東京都渋谷区幡ケ谷2丁目43番2号 オリンパス光学工業株式会社内
⑦発 明 者 居 沢 均 東京都渋谷区幡ケ谷2丁目43番2号 オリンパス光学工業株式会社内
⑦発 明 者 斉 藤 圭 也 東京都渋谷区幡ケ谷2丁目43番2号 オリンパス光学工業株式会社内

Demande de brevet japonais publiée sous le n° 2-121 675
(publiée le 9 mai 1990)
Demande n° 63-275 632 (déposée le 31 octobre 1988)
Demandeur : Olympus Optical Co., Ltd.

Titre : Sonde pour traitement thérapeutique

Revendication (revendication unique) :

Sonde pour traiter une partie affectée dans un corps thérapeutiquement, comprenant une enveloppe de sonde (2) insérable dans un , une pluralité d'aiguilles chauffantes (5) entourées par ladite enveloppe de la sonde (2) d'une manière telle que les extrémités de sommet desdites aiguilles chauffantes (5) peuvent être projetées en-dehors de l'enveloppe de la sonde (2) de sorte qu'un objet (18) du corps soit percé avec lesdites aiguilles chauffantes (5), et un manipulateur (7) de la sonde.

Utilisation :

Traitement thérapeutique de la glande de la prostate.

Dessins :

4 : ballonnet, 3 : cathéter, 10 : générateur micro-ondes
14 : câble détecteur, 15 : thermomètre, 16 : dispositif de contrôle

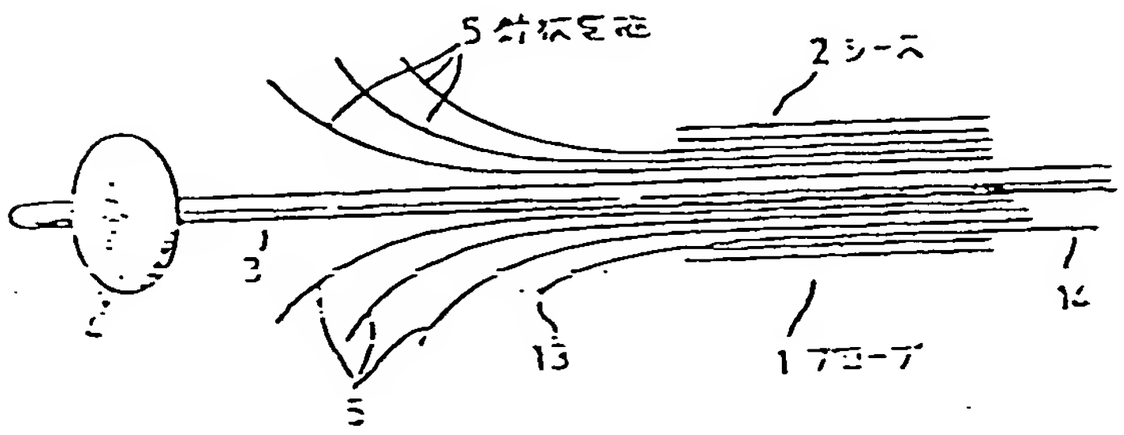


図 1 図

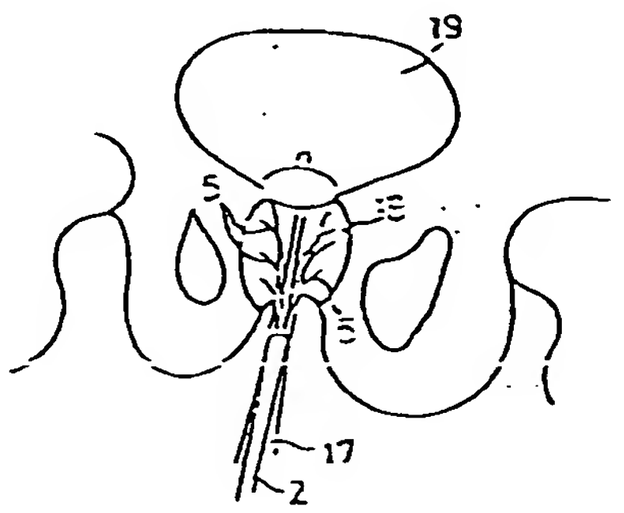


図 3 図

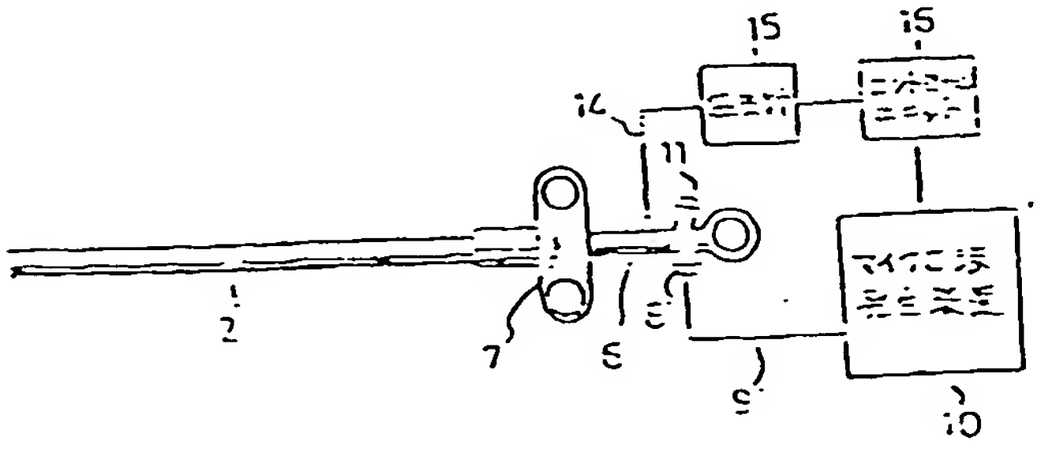


図 2 図

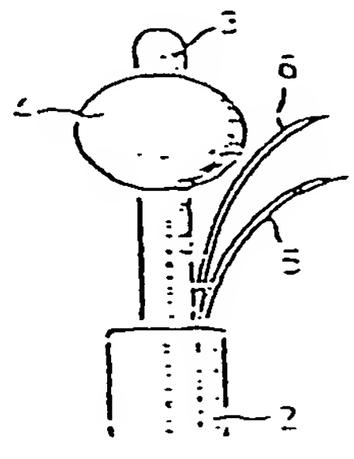


図 4 図

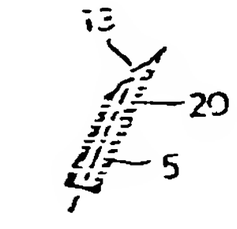


図 5 図

FOR INFORMATION PURPOSES ONLY

(19) JAPANESE PATENT OFFICE (JP)
(12) Official Gazette for Laid-Open Patent Applications (A)
(11) Japanese Laid-Open Patent Application (Kokai) No. Heisei 2-121675
(43) Disclosure Date: 9 May 1990

(51) Int. Cl.[5]:	Classification Symbols:	Internal Office Registration Nos.:
A 61 N 5/02		8932-4C

Request for Examination: Not yet submitted
Number of Claims: 1
(Total of 4 pages [in the original])

(54) Title of the Invention: Heat treatment probe

(21) Application No.: Showa 63-275632
(22) Filing Date: 31 October 1988

(72) Inventor : Makoto Inaba
C/o Olympus Optical Industries K.K,
2-43-2, Hataketani,
Shibuya-ku, Tokyo.
(72) Inventor : Koichiro Ishihara
C/o Olympus Optical Industries K.K,
2-43-2, Hataketani,
Shibuya-ku, Tokyo.
(72) Inventor : Takashi Tsuketani
C/o Olympus Optical Industries K.K,
2-43-2, Hataketani,
Shibuya-ku, Tokyo.
(72) Inventor : Shinji Hatta
C/o Olympus Optical Industries K.K,
2-43-2, Hataketani,
Shibuya-ku, Tokyo.
(72) Inventor: Eiichi Fuse
C/o Olympus Optical Industries K.K,
2-43-2, Hataketani,

Shibuya-ku, Tokyo
(72) Inventor: Masaaki Hayashi
C/o Olympus Optical Industries K.K,
2-43-2, Hataketani,
Shibuya-ku, Tokyo
(72) Inventor: Shiniichi Nishigaki
C/o Olympus Optical Industries K.K,
2-43-2, Hataketani,
Shibuya-ku, Tokyo
(72) Inventor: Hitoshi Karasawa
C/o Olympus Optical Industries K.K,
2-43-2, Hataketani,
Shibuya-ku, Tokyo
(72) Inventor: Tatsuya Saito
C/o Olympus Optical Industries K.K,
2-43-2, Hataketani,
Shibuya-ku, Tokyo
(71) Applicant: Olympus Optical Industries K.K,
2-43-2, Hataketani,
Shibuya-ku, Tokyo
(74) Agent: Patent Attorney, Jun Tsuboi (and 2 others)

SPECIFICATION

1. Title of the Invention

Heat treatment probe

2. Claims

Heat treatment probe for heat treating an affected part in the body cavity, which heat treatment probe is characterized in that it comprises: a probe main body which is inserted into the body cavity; a plurality of heat-imparting needle electrodes which are provided with freedom to project and retract from the end of the probe main body, and which are exposed to pierce the areas which are to be heated; and an operating means to expose the needle electrodes, wherein the probe main body is inserted into the body cavity, the needle electrodes are

exposed, and the areas which are to be heated are pierced and the heating carried out.

3. Detailed Description of the Invention

[Field of Industrial Utilization]

The present invention relates to a heat treatment probe for the heat treatment of, by way of example, the hypertrophied part of a prostate gland.

[Prior Art]

In recent years consideration has been given to a method of treating hypertrophied prostate glands using heat. This treatment utilizes the fact that when the prostate gland is heated to around 43°C the prostate gland hypertrophy is healed.

Hitherto, this heat treatment has been performed by the insertion of a catheter, in the perimeter of which is provided a microwave antenna, into the urethra, and the irradiation of microwaves from the antenna.

In addition, as is known through Japanese Laid-Open Patent No. Showa 62-292173, a method in which a conductor, such as a metal pipe, is provided in the outer circumference of the middle part of a tube body, and in which as a result a heat electric field is caused to be concentrated, has been proposed.

[Problems the Present Invention is Attempting to Solve]

However, because the above-described heat-imparting methods each involve the deployment of a microwave antenna or of heating electrodes in the areas which are to be heated, such as the surface of the prostate gland or the vicinity thereof, the affected part of the prostate gland or the like cannot be heated uniformly throughout. In addition, the heating cannot be performed reliably and efficiently throughout.

The present invention is designed with the above-described problems in mind, the objective of which is to provide a heat treatment probe, in which the areas that

are to be heated can be heated uniformly, reliably and efficiently throughout.

[Means and Action to Solve the Problems]

The heat treatment probe of the present invention, in order to solve the above-described problems comprises: a probe main body which is inserted into the body cavity; a plurality of heat imparting needle electrodes which are provided with freedom to project and retract from the end of the probe main body, and which are exposed to pierce the areas which are to be heated; and an operating means to expose the needle electrodes, wherein the probe main body is inserted into the body cavity, the needle electrodes are exposed, and the areas which are to be heated are pierced and the heating carried out.

Because a plurality of needle electrodes pierce the areas which are to be heated and carry out heating, the areas which are to be heated can be heated uniformly, efficiently and reliably throughout.

[Embodiment]

Figure 1 and Figure 3 show a first embodiment of the present invention. This embodiment is for the treatment of a hypertrophied prostate gland. As is shown in Figure 1, the heat treatment probe comprises, as a probe main body to be inserted into the body cavity, a flexible sheath 2, and a catheter 3 is inserted through this sheath 2. The end section of the catheter 3 is provided so as to jut out from the end opening of the sheath 2. A balloon 4 formed from rubber is provided in the end of the catheter 3. The catheter 3 is flexible, and a fluid supply hole (not shown in the diagram) is formed along the axial direction in the inner part thereof, and this has through-connection to the above-described balloon 4. The balloon 4 is normally contracted but, by the fluid supplied from the above-described fluid supply hole, expands as shown in Figure 1.

In addition, in the end of the above-described sheath 2, a plurality of needle electrodes 5, which each have a bending characteristic towards the outer side, are provided to project and retract with freedom from the end opening of the sheath 2. The needle electrodes 5 are through-connected to the end of an operation wire not shown in the diagram which is inserted into the inner part of the sheath 2, and this operation wire performs, by an operation handle 6 of the operation means provided in the side near at hand, an advance/retreat operation. The operation handle 6 is, as shown in Figure 2, mounted so as to advance and retreat freely with respect to a sheath support member 7 provided at the side near at hand to the base part of the above-described sheath 2. In addition, a connecting terminal 8, which provides conduction through to the above-described needle electrodes 5, is provided in the operation handle 6, and the connecting terminal 8 is connected to a microwave generating device 10 by way of a microwave transmission cable 9. Furthermore, a connector 11, which leads to the above-described catheter 3, is provided in the operation handle 6.

In addition, a plurality of needle electrodes 5 and a temperature-sensitive element part 13, which has freedom to protrude and retract from the opening end of the sheath 2, are provided in the end of the above-described sheath 2. This temperature-sensitive element part 13 comprises, by way of example, a thermoelement, and a temperature measurement cable 14 which leads thereto passing through the inner part of the sheath 2 to connect to a thermometer 15 deployed in the outer part. The temperature-measured data of the thermoelement 15 is connected to a control unit 16 for controlling the microwave-generating device 10.

Next, a description will be given of a method of using the temperature treatment system configured in this way. First, in a state in which the balloon 4 of the probe 1 is contracted, the handle 6 is caused to retreat

to the side near at hand. By virtue of this, the catheter 3 and balloon 4 are withdrawn into the sheath 2. In addition, the needle electrodes 5 and temperature-sensitive element part 13 are also withdrawn into the sheath 2.

Thereupon, the sheath 2 is inserted into the urethra 17, and the end part of the sheath 2 is positioned at the point of the hypertrophied prostate gland 18 (affected part). As shown in Figure 3, the balloon 4, needle electrodes 5 and temperature-sensitive element part 13 are caused to protrude from the end of the sheath 2 thereof by virtue of the fact that the sheath 2 is caused to retreat.

The needle electrodes 5, which each have a bending characteristic which curves toward the outer side, pierce the hypertrophied prostrate gland 18. The temperature-sensitive element part 13 abuts or pierces the surface part of the prostate gland 18. In addition, air is fed into the balloon 3 that causes it to expand. By virtue of this, the balloon 3, in a state in which it abuts the wall surface of the bladder 19 side in the rear of the prostate gland 18, expands to be linked, and the probe 1 is fixed.

Accompanying this, measurement of the temperature of the prostate gland 18 by the thermometer 15 is begun and the microwave generating device 10 is operated to supply microwave energy, by way of the microwave transmission cable 9, to the above-described needle electrodes 5, and the microwaves are emitted to heat the prostate gland 18. At this time, the temperature of the prostate gland 18 which is heated is measured by the above-described thermometer 15, and the output of the microwaves are controlled by a control unit 16 in such a way that the temperature thereof is maintained around 43°C (by way of example 42° to 45°C).

However, the prostate gland 18 with the above-described affected part is heated from the inner part thereof by the needle electrodes 5, which are pierced

therein, whereby uniform heating throughout can be performed.

It will be noted that the above-described catheter 3 is one that is hollow through to the end, and a guide wire may be inserted therein to assist in the insertion of the probe.

Figure 4 and Figure 5 show a second embodiment of the present invention. This embodiment is one in which, at the least, one of the needle electrodes 5 are of a hollow form as shown in Figure 5, and a temperature-sensitive element part 13 comprising a thermoelement is inserted into this hollow part 20. Using this, the needle electrodes 5 and temperature-sensitive element part 13 can pierce the affected part. For this reason, the temperature can be more precisely measured.

It will be noted that the present invention is not limited to the above-described embodiments. A variety of modifications are possible provided the main essence of the invention is not lost. In addition, the subject of treatment for which it is to be used is not limited to a prostate gland. In addition, a method may be employed in which the above-described needle electrodes are configured as a high frequency electrodes in which two form a pair, and an electric current heating is performed by the supply of a high frequency energy across the electrodes thereof.

[Effect of the Invention]

Since the heat treatment probe for the affected part of a body cavity of the present invention as described above is one in which a plurality of needle electrodes pierce the parts which constitutes those to be heated and performs heating, the heating of the parts which constitutes those to be heated can be carried out uniformly, efficiently, and reliably throughout.

4. Brief Description of the Diagrams

Figure 1 is a side surface view of the heat treatment probe which constitutes a first embodiment of the present invention; Figure 2 is a block explanatory diagram which includes the heat treatment system of the same said first embodiment; Figure 3 is a usage explanatory diagram of the heat treatment system of the same first embodiment; Figure 4 is a side surface view of the end region of a heat treatment probe which shows a second embodiment of the present invention; and Figure 5 is a side surface view of the end edge part of the needle electrodes in said second embodiment.

1 Heat treatment probe, 2 Sheath,
5 Needle electrodes, 6 Operation handle,
7 Sheath support member, 18 Prostate gland,

Agent: Patent Attorney, Jun Tsuboi

Fig. 3

Fig. 4

Fig. 5

5 Needle electrodes

2 Sheath

1 Probe

Fig. 1

15 Thermometer 16 control unit

10 Microwave generating device

Fig 2